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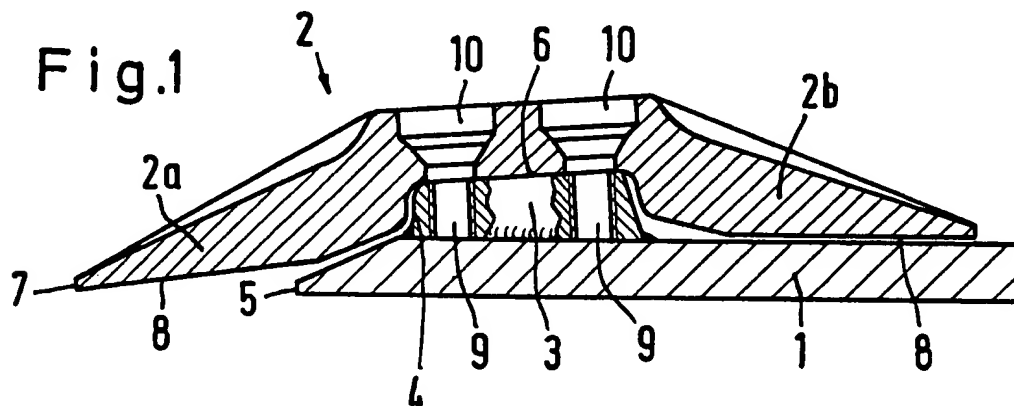
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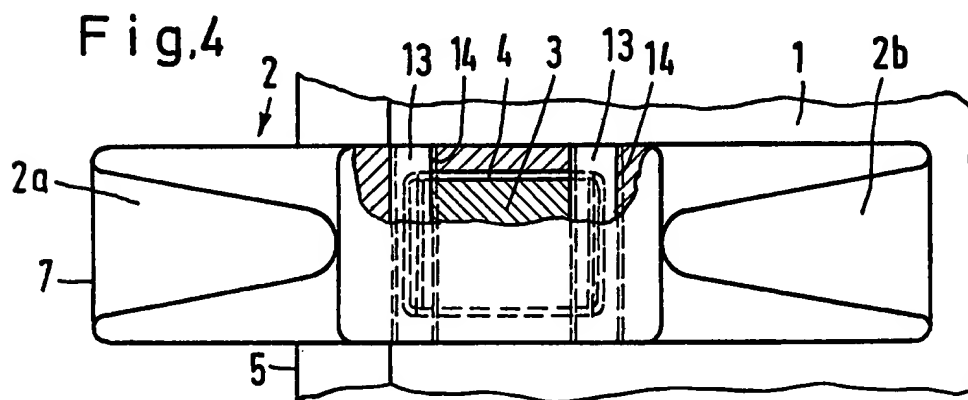
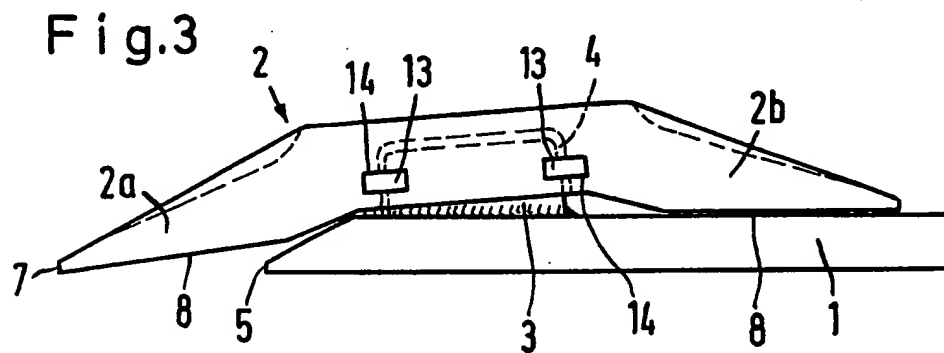
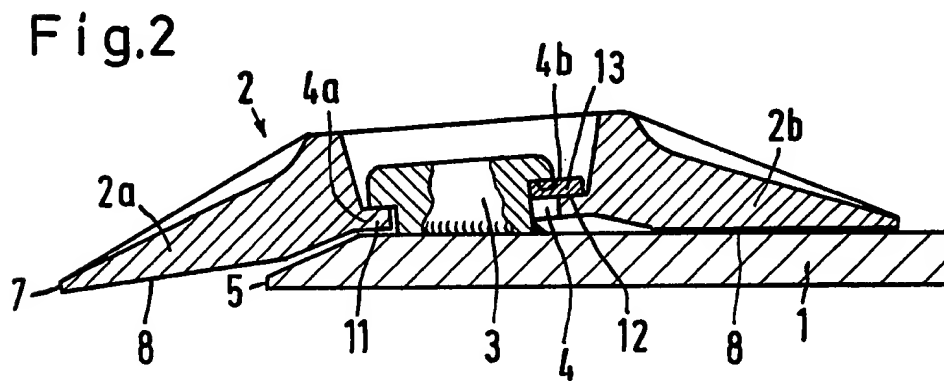
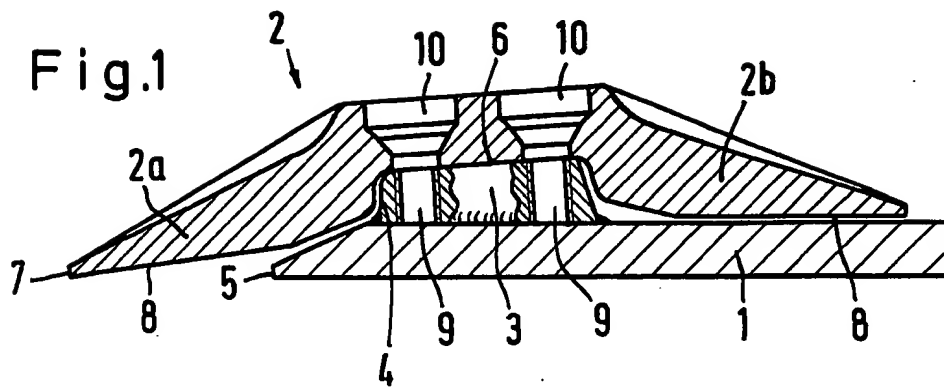
Selected US specifications from IPC sub-class E02F

(54) Tool unit for mechanical shovels, front loaders, grabs or the like

(57) A tool unit for mechanical shovels or the like, comprises an assembly plate (1) and reversible replaceable teeth (2) mounted in the front area of the assembly plate on retaining blocks (3), and the undersides of the replaceable teeth have retaining holes (4) corresponding to the retaining blocks, fitting round the retaining blocks. The replaceable teeth (2) are detachably secured on the retaining blocks (3) by bolts or wedges, and are inclined towards a blade edge (5), on the assembly plate, which is thus adapted as a cutting blade, and the cutting edges (7) of the front teeth (2a) overlap the blade edge (5) so that the blade edge is protected. The undersides (8) of the teeth (2) are chamfered so that the rear teeth (2b) lie close to the assembly plate (1), thus ensuring that the replaceable teeth are protected.



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SPECIFICATION

Tool unit for mechanical shovels front loaders grabs or the like

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This invention relates to a tool unit for mechanical shovels, front loaders, grabs or the like, comprising an assembly plate and replaceable teeth releasably mounted in the front area of the assembly plate, in which the top face of the assembly plate carries retaining blocks, and the undersides of the replaceable teeth have retaining holes corresponding to the retaining blocks, fitting round the retaining blocks, and the replaceable teeth are detachably secured on the retaining blocks. The retaining blocks can easily be welded to the assembly plate. Consequently, tapped holes for bolts for securing the replaceable teeth to the retaining blocks can be prepared beforehand, so that no difficulties will arise in this respect when fitting teeth to an assembly plate on site. At the same time, the original strength of the assembly plate is preserved, since it is not impaired by forming the necessary tapped holes.

There is a known tool unit of the type initially described, for mechanical shovels or the like, in which the replaceable teeth overlap the front edge of the shovel, whereby the shovel edge exerts no cutting action.

There are other known tool units in which the assembly plate has tapped holes, while the replaceable teeth have two through holes, one behind the other near the midpoint, into and through which countersunk holding bolts can be inserted. In these known tool units, the assembly plate is weakened by the tapped holes. Moreover, the tapped holes must always register exactly with the through holes in the replaceable teeth, since otherwise tooth replacement would be impossible. It is in fact almost impossible to form tapped holes in the assembly plate on site, when the replaceable teeth are actually being fitted.

The object of the invention is to provide a tool unit of the type initially described, for mechanical shovels, front loaders, grabs or the like, such that not only is it possible to fit new replaceable teeth to the assembly plate, rapidly, easily and without weakening the assembly plate, even on site, but furthermore such that the assembly plate can exert a cutting action and is protected by the overlapping replaceable teeth so that this cutting action is available substantially indefinitely.

According to the present invention, the assembly plate is formed as a cutting blade with a frontal cutting edge, and each of the retaining blocks has a supporting face for a replaceable tooth inclined towards the blade edge, so that cutting edges of the replaceable teeth overlap the blade edge and are flush with the blade edge.

These features of the invention have the effect of protecting the blade edge of the assembly plate by the overlapping cutting edges of the replaceable teeth. The blade edge is protected because the cutting edges of the replaceable teeth are flush with the blade edge.

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The replaceable teeth are preferably reversible, and the undersides of the replaceable teeth to either side of the retaining holes are preferably chamfered so that the rear teeth lie close to the cutting blade (while the cutting edges of the front teeth remain flush with the blade edge) thus ensuring that the replaceable teeth are most satisfactorily secured (while protecting the blade edge).

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Further possibilities within the scope of the invention will now be described. Thus, there are in principle various possible ways of securing the replaceable teeth. In one embodiment, the retaining blocks have tapped holes, and the replaceable teeth are provided, in the known manner, in the region having the retaining holes, with through holes shaped and dimensioned to accommodate and rigidly secure countersunk holding bolts. However, another embodiment of independent significance is characterised in that the retaining blocks have front and rear undercuts, and each of the replaceable teeth has, in the region of the retaining hole, a front insertion lip and a rear locking shoulder, a locking wedge being driveable between the rear undercut on the retaining block and the rear locking shoulder on the replaceable tooth, transversely to the longitudinal tooth axis. This method of securing eliminates the use of holding bolts, thereby also avoiding the fouling of tapped holes or threaded bolts. In both these embodiments, the retaining blocks can be combined into a retaining-block strip for all the replaceable teeth. In another proposal within the scope of the invention and relating to tooth fixing, the replaceable teeth fit like caps on the holding blocks in the region of their retaining holes, while locking holes run transversely to the longitudinal teeth axis through the replaceable teeth in the region of their cap-like retaining holes and are aligned with grooves in the retaining blocks, locking wedges or like locking members being driveable through the locking holes to engage the grooves. In this case, once again, the replaceable teeth are secured on the retaining blocks in an advantageous, simple and functionally reliable manner.

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The advantages accruing from the invention are to be seen substantially in that it provides a tool unit for mechanical shovels, front loaders, grabs or the like, in which the assembly plate can be fitted with replaceable teeth without difficulty, even on site, and moreover without damaging and/or weakening the assembly plate. Furthermore, in the embodiment using fixing bolts, satisfactory alignment is always maintained between the tapped holes in the retaining blocks and the through holes

for the bolts securing the replaceable teeth. Alternatively, a simplified and functionally reliable wedge fixing can be used for the replaceable teeth. Moreover, when the assembly plate is formed as a cutting blade with the frontal cutting edge, protection of that blade edge results from the inclined arrangement of the replaceable teeth on the retaining blocks, whereby the cutting edges of the overlapping teeth are brought flush with the blade edge.

A number of embodiments of the invention will now be described, purely by way of example, with reference to the accompanying drawings, in which:

- 15 Figure 1 is a longitudinal section through a tool unit in accordance with the invention;
Figure 2 corresponds to Figure 1, but shows another embodiment of the invention;
20 Figure 3 is a side elevation of yet another embodiment of the invention; and
Figure 4 is a plan view of the unit of Figure 3 partially in section.

The drawings show tool units for mechanical shovels, front loaders, grabs or the like, each comprising an assembly plate 1 and reversible replaceable teeth 2 (only one being shown) releasably mounted in the front area of the assembly plate 1. The top face of the assembly plate 1 carries welded-on retaining blocks 3, and the undersides of the replaceable teeth 2 have retaining holes 4 corresponding to the retaining blocks 3, fitting round the retaining blocks 3, the replaceable teeth 2 being detachably secured to the retaining blocks 3 by means to be described presently. In all the embodiments shown, the assembly plate is formed as a cutting blade 1 with a frontal cutting edge 5, and each of the retaining blocks 3 has an inclined supporting face 6 for the reversible replaceable tooth 2, so that the cutting edges 7 of the front teeth 2a overlap the blade edge 5 and are flush with the blade edge. It is further provided that the undersides 8 of the replaceable teeth 2 to either side of the retaining holes 4 are chamfered so that the rear teeth 2b lie close to the cutting blade 1 (while the cutting edges 7 of the overlapping front teeth 2a remain flush with the blade edge 5).

50 The retaining blocks 3 can have tapped holes 9, as shown in Figure 1, while the replaceable teeth 2 are provided, in the region having the retaining holes 4, with through holes 10 shaped and dimensioned to accommodate and rigidly secure countersunk holding bolts, which are not shown.

However, as shown in Figure 2, it is also possible to adopt an embodiment wherein in each of the retaining blocks 3 have front and rear undercuts 4a, 5b, while in the region of the retaining holes 4 the replaceable tooth 2 has a front insertion lip 11 and a rear locking shoulder 12, a locking wedge 13 being driveable between the rear undercut 4b on the retaining block 3 and the rear locking shoulder

12 on the replaceable tooth 2, transversely to the longitudinal tooth axis. In another embodiment shown in Figures 3 and 4, the replaceable teeth 2 fit like caps on the holding blocks 3 in the region of their retaining holes 4. Locking holes 14 run transversely to the longitudinal tooth axis through the replaceable teeth 2 in the region of their retaining holes 4 and are aligned with grooves in the retaining blocks 3, locking wedges 13 being driveable through the locking holes to engage the grooves. The locking wedges 13 can obviously be replaced by alternative locking members, for example rubberised metal members serving as locking bolts.

CLAIMS

1. A tool unit for mechanical shovels, front loaders, grabs or the like, comprising an assembly plate and replaceable teeth releasably mounted in the front area of the assembly plate, in which the top face of the assembly plate carries retaining blocks, and the undersides of the replaceable teeth have retaining holes corresponding to the retaining blocks, fitting round the retaining blocks, and the replaceable teeth are detachably secured on the retaining blocks, the assembly plate being formed as a cutting blade with a frontal cutting edge, and each of the retaining blocks having a supporting face for a replaceable tooth inclined towards the blade edge, so that cutting edges of the replaceable teeth overlap the blade edge and are flush with the blade edge.

2. A tool unit as in Claim 1, wherein the replaceable teeth are reversible, and the undersides of the replaceable teeth to either side of the retaining holes are chamfered so that the rear teeth lie close to the assembly plate.

3. A tool unit as in Claim 1 or Claim 2, wherein the retaining blocks have tapped holes, and wherein the replaceable teeth are provided, in known manner, in the region of the retaining holes, with through holes shaped and dimensioned to accommodate and rigidly secure countersunk holding bolts.

4. A tool unit as in Claim 1 or Claim 2, wherein the retaining blocks have front and rear undercuts, and wherein each of the replaceable teeth has, in the region of the retaining hole, a front insertion lip and a rear locking shoulder, a locking wedge being driveable between the rear undercut on the retaining block and the rear locking shoulder on the replaceable tooth, transversely to the longitudinal tooth axis.

5. A tool unit as in any one of Claims 1 to 4, wherein the retaining blocks are combined into a retaining-block strip for all the replaceable teeth.

6. A tool unit as in Claim 1 or 2, wherein the replaceable teeth fit like caps on the holding blocks in the region of their retaining holes, and locking holes run transversely to

the longitudinal axis through the replaceable teeth in the region of their retaining holes and are aligned with grooves in the retaining blocks, locking wedges or like locking members being driveable through the locking holes to engage the grooves.

5 7. A tool unit substantially as hereinbefore described with reference to Figure 1 of the accompanying drawings.

10 8. A tool unit substantially as hereinbefore described with reference to Figure 2 of the accompanying drawings.

15 9. A tool unit substantially as hereinbefore described with reference to Figures 3 and 4 of the accompanying drawings.

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